Installation Guide

NI-4100 NetLinx® Integrated Controller

Overview

The NI-4100 (**FG2105-06**), part of the NI Series of Master Controllers, is geared to meet the high-end control and automation requirements of the most sophisticated and complex commercial and residential installations.

This controller integrates the largest number of devices including DVD players, projectors, lighting, thermostats and other electronic equipment. In technology-intensive environments, this solution can be used to accommodate the future addition of more devices and control capabilities.

FIG. 1 NI-4100 NetLinx Integrated Controller (front view)

The NI-4100's on-board Master also provides the ability to update installed control card firmware.

ATTENTION!

*Verify you are using the latest NI firmware for the on-board Master. Verify you are using the latest version of NetLinx Studio (available for download from **www.amx.com**).*

Specifications

NI-4100 Specifications	
Dimensions (HWD):	• 5.21" x 17.00" x 9.60" (13.23 cm x 43.18 cm x 24.27 cm) • 3 rack units high
Power Requirement:	• 900 mA @ 12 VDC
Memory:	• 64 MB SDRAM • 1 MB Non-volatile (NV) SRAM
Compact Flash:	128 MB or more • AMX may increase Flash size at any time in response to market availability • Upgradeable - see *Other AMX Equipment*
Weight:	9.15 lbs (4.15 kg)
Enclosure:	Metal with black matte finish
Certifications:	FCC Part 15 Class B, CE, and IEC 60950
Front Panel LEDs/Slots:	
• LINK/ACT:	Green LED blinks when the Ethernet cables are connected and terminated correctly. Also blinks when receiving Ethernet data packets.
• Status:	Green LED blinks to indicate that the system is programmed and communicating properly.
• Output:	Red LED blinks when the Controller transmits data, sets channels On and Off, sends data strings, etc.
• Input:	Yellow LED blinks when the Controller receives data from button pushes, strings, commands, channel levels, etc.
• RS-232/422/485:	7 sets of red and yellow LEDs light to indicate that DB9 Ports 1 - 7 are transmitting or receiving RS-232, 422, or 485 data.
• Relay:	8 red LEDs light to indicate the relay channels 1 - 8 are active (closed). These LEDs reflect the state of the relay on Port 8.
• IR/Serial:	8 red LEDs light to indicate the IR/Serial channels 1 - 8 are transmitting control data on Ports 9 - 16. LED indictor for each IR port remains lit for the length of time that IR/Serial data is being generated.
• I/O:	8 yellow LEDs light when the rear I/O channels 1 - 8 are active. The LED for each I/O port reflects the state of that particular port.
• NetLinx Control Card Slots 1 - 4:	Accepts up to 4 compatible NetLinx Cards: such as the NXC-COM2, NXC-I/O10, etc.
Rear Panel Components:	
• RS-232/422/485 (Ports 1 - 7):	7 RS-232/422/485 control ports using DB9 (male) connectors with XON/XOFF (transmit on/transmit off), CTS/RTS (clear to send/ready to send), and 300-115,200 baud.
• ICSNet:	2 RJ-45 connectors for ICSNet interface (provided by optional ICSNet daughter card).
• ICSHub Out:	RJ-45 connector provides data to a Hub connected to the Controller (provided by optional ICSNet daughter card).
• Relay (Port 8):	• Eight-channel single-pole single throw relay ports • Each relay is independently controlled. • Supports up to 8 independent external relay devices • Channel range = 1-8 • Each relay can switch up to 24 VDC or 28 VAC @ 1 A • Two 8-pin 3.5 mm mini-Phoenix (female) connectors provide relay termination

NI-4100 Specifications (Cont.)	
Rear Panel Components (Cont.):	
• Digital I/O (Port 17):	8-channel binary I/O port for contact closure with each input being capable of voltage sensing. Input format is software selectable with interactive power sensing for IR ports.
• IR/Serial (Ports 9 - 16):	8 IR/Serial control ports support high-frequency carriers of up to 1.142 MHz with each output being capable of two electrical formats: IR or Serial. • 8 IR/Serial data signals can be generated simultaneously. • IR ports support data mode (at limited baud rates and wiring distances).
• Program Port:	RS-232 DB9 connector (male) can be connected to a DB9 port on a PC. This connector can be used with serial and NetLinx programming commands, as well as other DB9 capable devices, to both upload/download information from the NetLinx Studio program.
• Configuration DIP Switch:	Sets the communication parameters for the Program port (see *Baud Rate Settings*).
• ID Pushbutton:	Sets the NetLinx ID (Device only) assignment for the device.
• Ethernet Port:	RJ-45 connector provides TCP/IP communication. This is an Auto MDI/MDI-X enabled port, which allows you to use either straight-through or crossover Ethernet cables. The Ethernet Port LEDs show communication activity, connection status, speeds, and mode information: • *SPD (speed)* - Yellow LED lights On when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps. • *L/A (link/activity)* - Green LED lights On when the Ethernet cables are connected and terminated correctly, and blinks when receiving Ethernet data packets.
• AxLink Port:	4-pin 3.5 mm mini-Phoenix (male) connector that provides data and power to external control devices. Green AXlink LED indicates the state of the AXlink port.
• Power Port:	2-pin 3.5 mm mini-Phoenix (male) connector.
• CardFrame # DIP Switch:	Sets the starting address for the Control Cards in the CardFrame. *(Factory default CardFrame DIP switch value = 0). The Control Card address range is 1-3064.*
• Control Card Connectors (1-4):	20-pin (male) connectors that connect the Control Cards and external equipment to the CardFrame.
Included Accessories:	• 2-pin 3.5 mm mini-Phoenix (female) PWR connector (41-5025) • 4-pin 3.5 mm mini-Phoenix (female) AXlink connector (41-5047) • 10-pin 3.5 mm mini-Phoenix (female) I/O connector (41-5107) • Installation Kit (KA2105-01): - 8-pin Relay Common Strip - 4 rack mount screws - 4 washers • 2 8-pin 3.5 mm mini-Phoenix (female) Relay connectors (41-5083) • 2 CC-NIRC NetLinx IR Emitter Cables (FG10-000-11) • 2 removable rack ears (62-2105-07)
Other AMX Equipment:	• 2-pin 3.5 mm mini-Phoenix male connector (41-5026) • CC-NSER IR/Serial cables (FG10-007-10) • NCK, NetLinx Connector Kit (FG2902) • STS, Serial To Screw Terminal (FG959) • Upgrade Compact Flash (factory programmed with firmware): NXA-CF2NI256M - 256 MB compact flash card (FG2116-47) NXA-CF2NI512M - 512 MB compact flash card (FG2116-48) NXA-CF2NI1G - 1 GB compact flash card (FG2116-49)

Connections and Wiring

FIG. 2 shows the layout of the connectors and components on the rear of the NI-4100 NetLinx Integrated Controller.

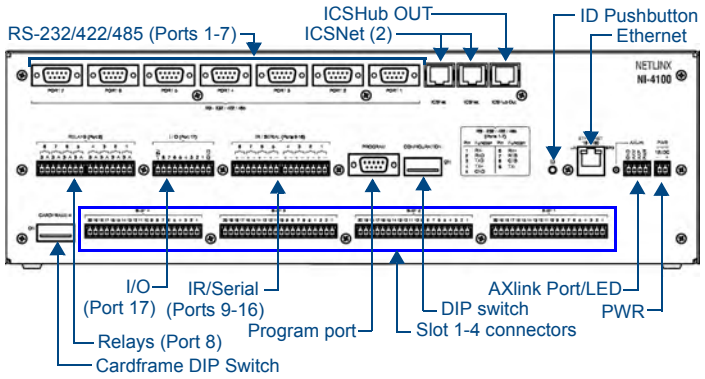


FIG. 2 NI-4100 rear connectors and components

Inserting NetLinx Cards into the NetLinx Control Card Slots

NetLinx Cards can be installed into the front card slots. The cards mount horizontally through the card slot openings on the front panel of the enclosure.

To install a NetLinx Card:

1. Discharge the static electricity from your body by touching a grounded metal object and unplug all the connectors from the unit.
2. Remove the three screws by turning them in a counter-clockwise direction and remove the front faceplate.
3. Align the edges of the card with the internal guide slots and gently slide it in all the way until the rear edge of the card snap into place.
4. Re-secure the faceplate by inserting the three screws by turning them in a clockwise direction and securing the front faceplate to the Controller.
5. Re-apply power and other connections as necessary.

Setting the Integrated Controllers' starting Card Address

The rear 8-position CardFrame Number DIP switch, lower-left rear of the Integrated Controller, sets the starting address (the device number in the D:P:S specification) for the Control Cards installed in the controller.

The Control Card address range is **1 - 3064**.

The factory default CardFrame DIP switch value = 0 *(All CardFrame DIP switches in the OFF position).*

The formula for setting the starting address is:

(DIP switch value) + Card slot Number (1 - 4) = Card Address

For example:

A DIP switch setting of 00010101:

(0 + 0 + 0 + 96 + 0 + 384 + 1536) + SLOT #(ex:1) = 2017.

A card in slot number 1 = device address 2017.

Set the CardFrame Number DIP switch value is based on the table below.

Position	1	2	3	4	5	6	7	8
Value	12	24	48	96	192	384	768	1536

ON position

Cycle power to the unit for approximately 5 seconds. This allows the unit to read the new device number settings.

Wiring a power connection

Use a 12 VDC-compliant power supply to provide power to the Controller via the rear 2-pin 3.5 mm mini-Phoenix connector. *Use the power requirements information listed in the Specifications table to determine the power draw.*

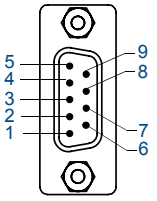
The incoming PWR and GND cable from the PSN power supply must be connected to their corresponding locations within the PWR connector.

- *This unit should only have one source of incoming power.*
- *Using more than one source of power to the Controller can result in damage to the internal components and a possible burn out.*
- *Apply power to the unit only after installation is complete.*

RS-232/422/485 wiring connector information

FIG. 3 shows the pinout and wiring specification information for the rear RS-232/RS-422/RS-485 (DB9) Device Ports. These ports support most standard serial mouse control devices and RS-232 communication protocols for PC data transmission.

The NI-4100 uses Ports 1 - 7.



DB9 Serial Port pinouts (male connector)

RS-232	RS-422	RS-485
Pin 2: RX signal	Pin 1: RX -	Pin 1: A (strap to 9)
Pin 3: TX signal	Pin 4: TX +	Pin 4: B (strap to 6)
PIN 5: GND	PIN 5: GND	PIN 5: GND
Pin 7: RTS	Pin 6: RX +	Pin 6: B (strap to 4)
Pin 8: CTS	Pin 9: TX -	Pin 9: A (strap to 1)

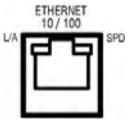
FIG. 3 RS-232/422/485 DB9 (male) connector pinouts

WARNING: *When wiring the 422/485 connections, do* ***NOT*** *use pre-made 9-wire cable or connect the wire in the cable to any connection that will not be used by the DB9 serial port. Only use wiring that connects the needed pins.*

Ethernet 10/100 Base-T Connector

The RJ-45 Ethernet connector provides 10/100 network connectivity between the panel and the NetLinx Master (FIG. 4).

L/A - Link/Activity LED lights (green) when the Ethernet cables are connected and terminated correctly.



SPD - Speed LED lights (yellow) when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps.

FIG. 4 Layout of Ethernet LEDs

Use a standard CAT5 Ethernet cable to provide communication between the Integrated Controller and external NetLinx devices.

Baud Rate Settings (Program Port DIP Switch)

The Program Port DIP switch is located on the rear of the device. Use this DIP switch to set the baud rate for the Program Port, according to the settings shown in the following table. Make sure the baud rate you set matches the baud rate on your PC's NetLinx COM Settings before programming the unit.

Baud Rate Settings				
Baud Rate	**Position 5**	**Position 6**	**Position 7**	**Position 8**
• 9600 bps	OFF	ON	OFF	ON
• 38,400 bps (**default**)	OFF	ON	ON	ON
• 57,600 bps	ON	OFF	OFF	OFF
• 115,200 bps	ON	ON	ON	ON

Note*: DIP switch 1 activates/deactivates the Program Run Disable Mode. DIP Switches 2,3, and 4 must remain OFF at all times.*

Ethernet Ports Used by the NI-4100

Ethernet Ports Used		
Port type	**Port #**	**Type**
• FTP	21/20	TCP
• SSH (only *SSH v2 is supported*)	22	TCP
• Telnet	23	TCP
• HTTP	80	TCP
• HTTPS/SSL	443	TCP
• ICSP	1319	UDP/TCP
• integration! Solutions	10500	TCP

Preparing the NI-4100 for Serial Communication

To establish serial communication with the Controller via the PROGRAM (DB9) port:

1. Use a Serial DB9 cable (i.e. CC-COM Programming Port Cable - not included) to connect the Controller's Program port to a DB9 port on a PC.
2. Launch NetLinx Studio 2.x (default location is **Start** > **Programs** > **AMX Control Disc** > **NetLinx Studio 2** > **NetLinx Studio 2**).
3. Select **Settings** > **Master Communication Settings**, from the menu bar, to open the *Master Communication Settings* dialog box.
4. Click the **Communications Settings** button to open the *Communications Settings* dialog.
5. Click the **NetLinx Master** radio button (from the *Platform Selection* section) to indicate you are working with a NetLinx Master.
6. Click the **Serial** radio button (from the *Transport Connection Option* section) to indicate you are connecting to the Master via a COM port.
7. Click the **Edit Settings** button (on the *Communications Settings* dialog) to open the *Serial Settings* dialog and set the COM port parameters (used to communicate to the NetLinx Master).
8. Click **OK** to close all dialogs and return to the main application.
9. Right-click the **Online Tree** tab entry and select **Refresh System:** the Controller should appear in the Device Tree. If not, verify that the Serial cable is connected properly, and that the Baud Rate settings on the Controller (set via the Program Port DIP Switch) match the settings in NetLinx Studio.

Once Serial communication has been established, use NetLinx Studio to configure the Controller for Ethernet Communication, as described below.

Configuring the NI-4100 for Ethernet Communication

Before continuing, complete the COM port steps above.

1. Use an Ethernet cable to connect the Controller to the LAN to which the PC running NetLinx Studio is connected.

   Note*: The NI-x100 Controllers feature an Auto MDI/MDI-X Ethernet port. This provides the option of using either a standard (straight through), or a crossover Ethernet cable to communicate with a PC - both cable types will work.*
2. Select **Diagnostics** > **Network Address** from the menu bar and enter the System, Device *(0 for a Master)*, and Host Name information.
3. To configure the Address:
   - Use a DHCP Address by selecting the **Use DHCP** radio button, then click the **GET IP** button (*to obtain a DHCP Address from the DHCP Server*), click the **SET IP Information** button (*to retain the new address*), and then finish the process by clicking the **Reboot Master** > **OK** buttons.
   - Use a Static IP Address by selecting the **Specify IP Address** radio button, enter the IP parameters into the available fields, then click the **SET IP Information** button (*to retain the pre-reserved IP Address to the Master*), and then click the **Reboot Master** > **OK** buttons to finish the process.
4. Repeat steps 1 - 5 from the previous section, but rather than selecting the **Serial** option, choose **TCP/IP** and edit the settings to match the IP Address you are using (Static or IP).
5. Click on the **Authentication Required** radio box (*if the Master is secured*) and press the **User Name and Password** button to enter a valid username and password being used by the secured Master.
6. Click the **OK** to close all dialogs and return to the main application.

Onboard WebConsole

NetLinx Masters have a built-in WebConsole that allows you to make various configuration settings via a web browser on any PC that has access to the Master. The webconsole consists of a series of web pages that are collectively called the "Master Configuration Manager".

Accessing the WebConsole

From any PC that has access to the LAN that the target Master resides on:

1. Open a web browser and type the IP Address of the target Master in the Address Bar.
2. Press Enter to access WebConsole for that Master. The initial view is the *WebControl* page.

Additional Documentation

Additional Documentation for the N1-4100 is available at www.amx.com.

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